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09/599,027	06/22/2000	Nagayoshi Ichikawa	016887/0999	8692

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EXAMINER

PALABRICA, RICARDO J

ART UNIT PAPER NUMBER

3641

DATE MAILED: 02/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/599,027

Applicant(s)

ICHIKAWA ET AL.

Examiner

Rick Palabrica

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 11 December 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-10, 12 and 14-20 is/are pending in the application.
- 4a) Of the above claim(s) 1-9, 16, 19-22 and 26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 10, 12, 14, 15, 17, 18 and 23-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

1. Applicant's Request for Continued Examination, dated 12/11/02, and submission of amendment, dated 11/12/02, is acknowledged. The amendment cancelled claim 13 and amended claims 10, 12, 15, 17, 18 and 25.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

### ***Specification***

2. The specification is objected to under 35 U.S.C. 112, first paragraph, as failing to provide an adequate written description of the invention and as failing to adequately teach how to make and/or use the invention, i.e., failing to provide an enabling disclosure.

The claimed invention is a method for suppressing corrosion of a reactor structural member. However, there is no adequate or enabling disclosure of how such could be accomplished using the applicant's invention.

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Claim 10 recites the limitation of providing a corrosion potential reducing substance being formed as "particles made of  $\text{TiO}_2$ , each particle having a surface on which at least one of Pt, Rh, Ru and Pd is provided."

There is neither an adequate description not enabling disclosure as to what exactly constitutes a "particle". Note that "particle" means a minute quantity or fragment. Does the term particle, as used in the claim mean one molecule of  $\text{TiO}_2$  or several molecules of  $\text{TiO}_2$ ? If it is the latter, how many molecules would constitute a particle?

The disclosure is further insufficient as to the meaning of the clause, "having a surface on which at least one of Pt, Rh, Ru and Pd is provided". Does this mean one atom of Pt, Rh, Ru and Pd on the surface of a so-called  $\text{TiO}_2$  "particle", or does it mean that the entire surface of a particle is coated by one of said elements?

The disclosure is also insufficient as to how and in what manner does one assure or positively know that each  $\text{TiO}_2$  "particle" has been deposited such element(s) on its surface.

### ***Claim Rejections - 35 USC § 112***

3. Claims 10, 12, 14, 15, 17, 18 and 23-25 are rejected under 35 U.S.C. 112, first paragraph, for the reasons set forth in the objection to the specification in section 3 above.

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4. Claims 10, 12, 14, 15, 17, 18 and 23-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear what is encompassed by the term "particle" such that it renders the claims vague and indefinite, and the metes and bound thereof are undefined.

It is also unclear what is encompassed by the limitation, "having a surface on which at least one of Pt, Rh, Ru and Pd is provided," thus making the metes and bound of the claims undefined.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 10, 14, 15, 17, 18, and 25 are rejected under 35 U.S.C. 102(b) as being unpatentable over either one of Hettiarachchi (U.S. 5,818,893) or Hettiarachchi (U.S. 5,904,991).

Either one of Hettiarachchi ('893) or Hettiarachchi ('991) discloses a method for protecting against stress corrosion cracking in a water-cooled reactor by injection into the reactor water of a noble metal, such as platinum or palladium, in conjunction with

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titanium and hydrogen, to reduce the electrochemical corrosion potential at the surface of reactor components. Reactor materials susceptible to said stress corrosion include carbon steel, alloy steel, stainless steel, **nickel-based**, cobalt-based, and zirconium-based alloys (see column 1, lines 37-40, in Hettiarachchi ('893)). The noble metal (i.e., platinum or palladium) compound decomposes under reactor thermal and radiation conditions to release ions/atoms of the noble metal that incorporate in or deposit on the oxide film formed on stainless steel and other alloy components. Said oxide film can have a 0.1-1 micron thickness (see page 6, lines 45+, Hettiarachchi ('893)).

Hettiarachchi also discloses that mixtures of platinum group compounds and non-platinum group compounds may be used. Possible non-platinum group metals include titanium. Also when mixtures of platinum and non-platinum group metals are used, the platinum group metal is **in excess** of the other metal (see column 5, 2<sup>nd</sup> paragraph in Hettiarachchi ('893)). Note that introduction of titanium into the reactor water inherently produces  $\text{TiO}_2$ . Also, by having such excess of a platinum group metal over the non-platinum group metal (such as titanium), the  $\text{TiO}_2$  molecules would be coated with a platinum group metal.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 10, 14, 15, 17, 18, and 25 are rejected under 35 U.S.C. 102(b) as being unpatentable over Andresen et al. (U.S. 5,608,766) in view of either one of Hettiarachchi ('893) or Hettiarachchi ('991). Andresen et al. disclose the applicant's claim except for the specific thickness of the potential reducing substance.

Andresen et al. disclose a method to mitigate stress corrosion cracking in a water-cooled reactor by doping stainless steel surfaces with a noble metal (e.g., palladium) in-situ into the high-temperature water of the reactor (see column 6, last paragraph). The noble metal can be injected in conjunction with injection of small amounts of hydrogen (see column 9, top paragraph). The method optionally includes the step of removing some or all of the oxide film on the surface of the reactor component in situ and then co-depositing metal, e.g., palladium during subsequent growth of the oxide film. The result is a metal-doped oxide film having a relatively longer catalytic life in the reactor-operating environment (see column 5, 2<sup>nd</sup> to last paragraph).

Andresen discloses the use of a combination of noble metals and corrosion-inhibiting metals, including titanium (e.g., see claims 1 and 5).

As discussed in section 4 above, Hettiarachchi teaches that when a mixture of platinum and non-platinum group metals are used, the platinum group metal is in excess of the other metal. He further teaches an oxide film that can have a 0.1-1 micron thickness.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method, as disclosed by Andresen, by

the teachings of Hettiarachchi, in order to have a corrosion potential reducing substance of  $\text{TiO}_2$  coated with a platinum group metal formed on the surface of a reactor structural member to a thickness of 0.1 to 1 micron, because such modification is no more than the use of conventional designs/techniques within the nuclear art, and the use of well-known concentration ratios and coating thickness for the electrochemical potential reducing substance.

6. Claims 12, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over either one of Hettiarachchi ('893) or Hettiarachchi ('991), as applied to claims 10, 14, 15, 17, 18, and 25 above, and further in view of either one of Uetake et al. (U.S. 5,377,245) or Panson et al. (U.S. 4,842,812). Either one of Hettiarachchi ('893) or Hettiarachchi ('991) discloses the applicant's claims except for controlling the iron concentration by a purifier and demineralizer.

Either one of Uetake et al. or Panson et al. teach for mitigating the radiation exposure of personnel by reducing the amount of iron "crud" in the reactor water. Either one of these references disclose the use of a clean-up device (e.g. a filter) and demineralizer to remove said crud contained in the condensed water (e.g. see Fig. 1 and column 6, lines 35+ of Uetake et al., or Fig. 1 and column 5, 2<sup>nd</sup> paragraph of Panson et al.). One having ordinary skill in the art would have recognized the advantages of crud reduction, in addition to stress corrosion mitigation, as part of nuclear power plant operation, and the addition of such crud reduction process would have been prima facie obvious.



Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method, as disclosed by either one of Hettiarachchi ('893) or Hettiarachchi ('991), by the teaching of either one of Uetake et al. or Panson et al., to include an iron crud reduction process by a purifier and demineralizer in the condensing system of a reactor, to gain the advantages thereof (i.e., to further reduce of personnel radiation exposure), because such modification is no more than the use of conventional techniques within the nuclear art.

7. Claims 12, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over either one of the Andresen- Hettiarachchi ('893) combination or Andresen- Hettiarachchi ('991) combination, as applied to claims 10, 14, 15, 17, 18, and 25 above, and further in view of either one of Uetake et al. or Panson et al. . Either one of the two combinations discloses the applicant's claims except for controlling the iron concentration by a purifier and demineralizer.

Either one of Uetake et al. or Panson et al. teach for mitigating the radiation exposure of personnel by reducing the amount of iron "crud" in the reactor water. Either one of these references disclose the use of a clean-up device (e.g. a filter) and demineralizer to remove said crud contained in the condensed water (e.g. see Fig. 1 and column 6, lines 35+ of Uetake et al., or Fig. 1 and column 5, 2<sup>nd</sup> paragraph of Panson et al.). One having ordinary skill in the art would have recognized the advantages of crud reduction, in addition to stress corrosion mitigation, as part of nuclear power plant operation, and the addition of such crud reduction process would have been prima facie obvious.

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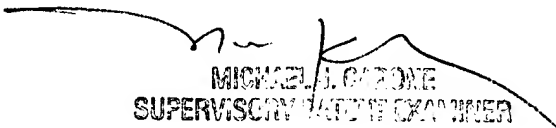
Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method, as disclosed by either one of Andresen- Hettiarachchi ('893) combination or Andresen- Hettiarachchi ('991) combination, by the teaching of either one of Uetake et al. or Panson et al., to include an iron crud reduction process by a purifier and demineralizer in the condensing system of a reactor, to gain the advantages thereof (i.e., to further reduce of personnel radiation exposure), because such modification is no more than the use of conventional techniques within the nuclear art.

### ***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rick Palabrica whose telephone number is 703-306-5756. The examiner can normally be reached on 7:00-4:30, Mon-Fri; 1st Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Carone can be reached on 703-306-4198. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-7687 for regular communications and 703-305-7687 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1113.



MICHAEL J. CARONE  
SUPERVISORY PATENT EXAMINER

RJP  
January 29, 2003